

**REMARKS**

This is a full and timely response to the outstanding final Office Action mailed January 30, 2004 (Paper No. 8). Upon entry of this response, claims 1-7, 9-16, 18-25, and 55-75 are pending in the application. In this response, claims 9-11, 13-16, 18-25, 55-56, and 61 have been amended, claims 8, 17, and 53 have been cancelled, and claims 66-75 have been added.

Applicant asserts that the amendments add no new subject matter to the present application.

Applicant respectfully requests that the amendments being filed herewith be entered and that there be reconsideration of all pending claims.

1. **Allowable Subject Matter**

Applicant appreciates the Examiner's allowance of claims 1-7 and 53. Claim 53 is cancelled without prejudice, waiver, or disclaimer. Applicant reserves the right to pursue the subject matter of this cancelled claim in a continuing application, if Applicant so chooses, and does not intend to dedicate any of the cancelled subject matter to the public.

Applicant also acknowledge the Examiner's indication in the Office Action that claims 11, 12, and 20 would be allowable if rewritten to include all of the limitations of the base claim and any intervening claims. Accordingly, Applicant has amended claims 11 and 20 to include the limitations of their respective base claims, so that claims 11 and 20 are now independent claims. Claim 12 depends from now independent claim 11. Accordingly, the Examiner is respectfully requested to place claims 11, 12, and 20 in condition for allowance.

Applicant wishes to clarify that the amendments to claims 11, 12, and 20 are made for purposes of presenting the claims in an independent claim format as requested by the Examiner, and not in response to any rejections made based on cited art. Because a dependent claim as a matter of law inherently contains all of the limitations of its respective parent independent claim,

and any intervening claims, the amendments to claims 11, 12, and 20 do not narrow the scope of claims 11, 12, and 20 as originally filed.

2. Rejection of Claims 8, 10, 13, 16, 17, 19, 21, 22, and 55 under 35 U.S.C. §102

Claims 8, 10, 13, 16, 17, 19, 21, 22, and 55 have been rejected under §102(e) as allegedly anticipated by *Sinha et al.* (U.S. 6,292,917). Applicant respectfully traverses these rejections. A proper rejection of a claim under 35 U.S.C. §102 requires that a single prior art reference disclose each element of the claim. *See, e.g., W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 U.S.P.Q. 303, 313 (Fed. Cir. 1983).

a. Claims 8 and 17

Claims 8 and 17 are cancelled without prejudice, waiver, or disclaimer, and therefore, the rejection of these claims is rendered moot. Applicant takes this action merely to reduce the number of disputed issues and to facilitate early allowance and issuance of other claims in the present application. Applicant reserves the right to pursue the subject matter of these cancelled claims in a continuing application, if Applicant so chooses, and do not intend to dedicate any of the cancelled subject matter to the public.

b. Claims 10 and 19

Applicant respectfully submits that *Sinha et al.* fails to teach, disclose or suggest at least “wherein said convolutional encoding means is a single convolutional encoder designed to process and encode said plurality of data streams” as recited in amended claim 10. Applicant also respectfully submits that *Sinha et al.* fails to teach, disclose, or suggest at least “wherein the step for convolutional encoding uses a single convolutional encoder to encode said plurality of data streams” as recited in amended claim 19.

*Sinha et al.* teaches multiple coders to achieve convolutional coding of multiple streams. (FIG. 5 shows “Channel Coders 214” and Col. 5, line 10 refers to “set of channel coders.”) For at least this reason, Applicant respectfully submits that *Sinha et al.* does not anticipate amended claims 10 and 19. Therefore, Applicant requests that the Examiner’s rejection of claims 10 and 19 be withdrawn.

c. Claims 13 and 22

Claim 13 has been amended to depend from claim 9. Claim 22 has been amended to depend from claim 18. Since claims 9 and 18 are allowable for at least the reasons described below, Applicant respectfully submits that claims 13 and 22 are allowable for at least the reason that each depends from an allowable claim. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q. 2d 1596, 1598 (Fed. Cir. 1988). Therefore, Applicant respectfully requests that the rejection of claims 13 and 22 be withdrawn.

d. Claim 16

Applicant respectfully submits that *Sinha et al.* fails to teach, disclose or suggest at least “means for independently defining data rates on said paths by separately defining a number of bits for each of said interleaved data segments” as recited in amended claim 16.

*Sinha et al.* appears to teach multiple channel coders, each providing input to an interleaver. (FIG. 5.) *Sinha et al.* discloses that different codes can be used for each channel. (Col. 6, lines 45-50.) However, all the implementations disclosed use the same code rate, and the same number of bits input to/output from each decoder. (Col. 5, line 25 to Col. 6, line 15.) Thus, it is not clear that *Sinha et al.* teaches that different code rates can be used, or that different numbers of bits can be input to/output from each coder.

However, even assuming, *arguendo*, that *Sinha et al.* contains these teachings, Applicant's claimed invention allows different data rates on the transmission paths by "separately defining a number of bits for each of said interleaved data segments." As shown in FIG. 3, Applicant's claimed invention produces multiple encoded streams and the encoded streams are interleaved before being provided to one of a plurality of mappers. By varying the number of bits provided to a mapper, different data rates can be achieved on each transmission path.

*Sinha et al.* contains no teaching about the number of bits in an interleaved data segment. Furthermore, *Sinha et al.* discloses no structure which corresponds to a "means for independently defining data rates on said paths by separately defining a number of bits for each of said interleaved data segments," as recited in amended claim 16.

For at least this reason, Applicant respectfully submits that *Sinha et al.* does not anticipate claim 16 as amended. Therefore, Applicant requests that the Examiner's rejection of claim 16 be withdrawn.

e. Claim 21

Since claim 20 is allowable, Applicant respectfully submits that claim 21 is allowable for at least the reasons that it depends from an allowable claim. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q. 2d 1596, 1598 (Fed. Cir. 1988). Therefore, Applicant respectfully requests that the rejection of claim 20 be withdrawn.

f. Claim 55

Applicant respectfully submits that *Sinha et al.* fails to teach, disclose or suggest at least "wherein each interleaved convolutionally-encoded data stream contains segments from more than one convolutionally-encoded data stream" as recited in claim 55.

*Sinha et al.* Teaches:

a classifier 212 which converts audio packets into separate bit streams corresponding to n different classes of audio information bits...The separate bit streams from the classifier 212 are applied to a set of channel coders 214. The symbol outputs of the channel coders 214 are supplied to a set of interleavers 215 that provide ***interleaving of the symbols within each channel*** over multiple audio packets.

(Col. 7, lines 5-15.) Another passage in *Sinha et al.* contains a similar teaching:

[A]udio information bits are separated into a class I which includes control bits and a first portion of the audio data bits, and a class II which includes a second portion of the audio data bits...In accordance with the present invention, the ***class I and II bits may be interleaved and transmitted independently over segments I and II, respectively***. Therefore, class I bits are exposed to the channel condition of segment I and class II bits face the channel condition in segment II.

(Col. 8, lines 10-20). Applicant respectfully submits that in *Sinha et al.*, each stream of output from interleaver 215 contains symbols from only one channel. In other words, class I bits are interleaved (rearranged in time) and transmitted over segment I. Class II bits are interleaved (rearranged in time) and transmitted over segment II. Segment I contains only class I bits, while segment II contains only class II bits.

In contrast, in Applicant's claimed invention, each interleaved stream contains symbols from more than one convolutional encoder, as recited in claim 55. For at least this reason, Applicant respectfully submits that *Sinha et al.* does not anticipate claim 55. Therefore, Applicant requests that the Examiner's rejection of claim 55 be withdrawn.

3. Rejection of Claims 56-58 and 61-63 under 35 U.S.C. §102

Claims 56-58 and 61-63 have been rejected under §102(e) as allegedly anticipated by *Marko* (U.S. 6,229,824). Applicant respectfully traverses these rejections. A proper rejection of a claim under 35 U.S.C. §102 requires that a single prior art reference disclose each element of

the claim. *See, e.g., W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 U.S.P.Q. 303, 313 (Fed. Cir. 1983).

a. Claims 56 and 61

Applicant respectfully submits that *Marko* fails to teach, disclose or suggest at least a “means for transmitting each of said encoded symbols alternately onto a selected one of a plurality of separate communication paths” as recited in amended claim 56 and the step of “transmitting said each of said encoded symbols alternately onto a selected one of a plurality of separate communication paths” as recited in amended claim 61.

*Marko* discloses an encoder 12, an interleaver 14, a demux 16 and two transmission channels 18 and 20. (FIG. 1.) The encoder 12 produces a sequence of encoded symbols. This sequence is first rearranged in time by interleaver 14. Next, the demux 46 selects the next symbol from the altered sequence for transmission onto either communication path 66 or 68. (See FIGs. 5 and 6).

In contrast, Applicant’s claimed invention uses one or more encoders followed by one or more switches. The encoder(s) produce a stream of encoded symbols, and the switches operate so that *each* encoded symbol in the stream is transmitted *alternately* onto one of the multiple communication paths. (Specification, p. 6, lines 15-25; p. 9, line 25 to p. 10, line 10.) Importantly, no time delays or buffers are used, as with *Marko*’s conventional time interleaver. Therefore the sequence of encoded symbols as produced by the encoder(s) is the same sequence that is transmitted.

Applicant’s claimed invention thus includes the feature a “means for transmitting each of said encoded symbols alternately onto a selected one of a plurality of separate communication paths” as recited in claim 56. Similarly, Applicant’s claimed invention includes the step of

“transmitting said each of said encoded symbols alternately onto a selected one of a plurality of separate communication paths” as recited in claim 61.

For at least the reason that *Marko* does not disclose, teach, or suggest the above-described features, Applicant respectfully submits that *Marko* does not anticipate claims 56 and 61 as amended. Therefore, Applicant requests that the Examiner’s rejection of claims 56 and 61 be withdrawn.

b. Claims 57-60 and 62-65

Since claims 56 and 61 are allowable, Applicant respectfully submits that claims 57-60 and 62-65 are allowable for at least the reasons that they depend from allowable claims. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q. 2d 1596, 1598 (Fed. Cir. 1988). Therefore, Applicant respectfully requests that the rejection of claims 57-60 and 62-65 be withdrawn.

4. Rejection of Claims 14, 15, 23, and 24 under 35 U.S.C. §103

Claims 14, 15, 23, and 24 have been rejected under §103(a) as allegedly obvious over *Sinha et al.* (U.S. 6,292,917) in view of the knowledge of one of ordinary skill in the art. Applicant respectfully traverses these rejections. Claims 14 and 15 have been amended to depend from claim 9. Claims 23 and 24 have been amended to depend from claim 18. Since claims 9 and 18 are allowable for at least the reasons described below, Applicant respectfully submits that claims 14, 15, 23, and 24 are allowable for at least the reason that they each depend from an allowable claim. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q. 2d 1596, 1598 (Fed. Cir. 1988). Therefore, Applicant respectfully requests that the rejection of claims 14, 15, 23, and 24 be withdrawn.

5. Rejection of Claims 59, 60, 64, and 65 under 35 U.S.C. § 103

Claims 59, 60, 64, and 65 have been rejected under § 103(a) as allegedly obvious over *Marko* (U.S. 6,229,824) in view of the knowledge of one of ordinary skill in the art. Applicant respectfully traverses these rejections. It is well established at law that, for a proper rejection of a claim under 35 U.S.C. §103 as being obvious based upon a combination of references, the cited combination of references must disclose, teach, or suggest, either implicitly, all elements/features/steps of the claim at issue. *See, e.g., In re Dow Chemical*, 5 U.S.P.Q.2d 1529, 1531 (Fed. Cir. 1988); *In re Keller*, 208 U.S.P.Q.2d 871, 881 (C.C.P.A. 1981).

Since claims 56 and 61 are allowable, Applicant respectfully submits that claims 59, 60, 64, and 65 are allowable for at least the reason that they each depend from an allowable claim. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q. 2d 1596, 1598 (Fed. Cir. 1988). Therefore, Applicant respectfully requests that the rejection of claims 59, 60, 64, and 65 be withdrawn.

6. Rejection of Claims 9 and 18 under 35 U.S.C. §103

Claims 9 and 18 have been rejected under §103(a) as allegedly obvious over *Sinha et al.* (U.S. 6,292,917) in view of *Zimmerman et al.* (U.S. 6,522,700). Applicant respectfully traverses these rejections. It is well established at law that, for a proper rejection of a claim under 35 U.S.C. §103 as being obvious based upon a combination of references, the cited combination of references must disclose, teach, or suggest, either implicitly, all elements/features/steps of the claim at issue. *See, e.g., In re Dow Chemical*, 5 U.S.P.Q.2d 1529, 1531 (Fed. Cir. 1988); *In re Keller*, 208 U.S.P.Q.2d 871, 881 (C.C.P.A. 1981).

Applicant respectfully submits that amended claims 9 and 18 are allowable for at least the reason that the proposed combination of *Sinha et al.* in view of *Zimmerman et al.* does not disclose, teach, or suggest “interleaving...so that each of said interleaved data streams comprise



data segments from each of said pluralities of convolutional encoding means” as recited in amended claims 9 and 18.

The Office Action alleges that element 30 in FIG. 2 of *Zimmerman et al.* teaches the above limitations. Applicant respectfully disagrees. *Zimmerman et al.* shows three convolutional encoders in FIG. 2: elements 32, 34, and 36. Importantly, each encoder provides input to only one block interleaver (52, 54, and 56). Thus, each interleaved data stream contains segments from only one convolutional encoder. In contrast, Applicant’s claimed invention includes the feature of “**Error! Reference source not found.**,” as recited in claims 9 and 18.

The Office Action admits that *Sinha et al.* does not teach the above limitations. (Office Action, page 6, paragraph 8.) Accordingly, the proposed combination of *Sinha et al.* in view of *Zimmerman et al.* does not teach at least the above-described limitations as recited in claims 9 and 18. Therefore, a *prima facie* case establishing an obviousness rejection has not been made. Thus, claims 9 and 18 are not obvious under the proposed combination, and the rejection should be withdrawn.

#### 7. Claim 25

Although the Office Action Summary indicates that claim 25 is rejected, the Office Action contained no specific rejection of claim 25. Applicant believes that claim 25 is allowable over the cited art of record for at least the reason that no combination of cited references teaches, discloses, or suggests at least “independently defining data rates on said paths by separately defining a number of bits for each of said interleaved data segments” as recited in amended claim 25. The Examiner is respectfully requested to refer to the above discussion of this feature of Applicant’s claimed invention with reference to claim 16.

8. Newly Added Claims

New claims 66-75 are based on subject matter that is explicit and/or inherent within the description of the specification and/or the drawings. Applicant submits that no new matter has been added in the new claims, and that new claims 66-75 are allowable over the cited prior art. Specifically, since claims 10-13, 20, and 56 are allowable for at least the reasons discussed above, Applicant respectfully submits that claims 66-75 are allowable for at least the reason that each depends from an allowable claim. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q. 2d 1596, 1598 (Fed. Cir. 1988). Therefore, Applicant requests the Examiner to enter and allow the above new claims.

**CONCLUSION**

Applicant respectfully requests that all outstanding objections and rejections be withdrawn and that this application and presently pending claims 1-7, 9-16, 18-25, and 55-75 be allowed to issue. If the Examiner has any questions or comments regarding Applicant's response, the Examiner is encouraged to telephone Applicant's undersigned counsel.

Respectfully submitted,

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